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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/670,526	09/26/2003	Soichi Kuwahara	SON-2826	6496
23353	7590	09/01/2005	EXAMINER	
RADER FISHMAN & GRAUER PLLC LION BUILDING 1233 20TH STREET N.W., SUITE 501 WASHINGTON, DC 20036			NGUYEN, LAM S	
			ART UNIT	PAPER NUMBER
			2853	

DATE MAILED: 09/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/670,526

Applicant(s)

KUWAHARA ET AL.

Examiner

LAM S. NGUYEN

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-42 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-42 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 11/02/04, 04/20/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 25 and 33 recite the limitation "the minimum value" on line 4 without sufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1, 2, 4, 5-7/2, 5-7/4, 8/2, 8/4, 9, 11-13, 15, 16-18/13, 16-18/15, 19/13, 19/15, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Silverbrook (WO 02/02330 A1) in view of Murcia et al. (US 6270187).

Referring to claims 1, 11:

Silverbrook discloses a liquid discharging method in an apparatus for discharging droplets from a plurality of liquid discharging portions while changing the dot diameter by the number of the discharged droplets, the method comprising the steps of:

discharging droplets from the liquid discharging portions to form an actual pattern (*FIG. 2*);

obtaining information about a defective liquid discharging portion having discharging failure by checking the actual pattern for the discharging states of the droplets from

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the liquid discharging portions (*FIG. 2: By checking the printed pattern, information about the defective nozzle H is obtained*); and

controlling discharging of droplets from a liquid discharging portion near the defective liquid discharging portion (*FIG. 3: Ink ejection from ink nozzles G and I adjacent to the defective ink nozzle H are controlled*).

Silverbrook is silent wherein the defective liquid discharging portion is prohibited from discharging and wherein the apparatus comprises a head driver for controlling the driving of the liquid discharging head, an image processing unit that converts externally input image data into head driving data for driving the liquid discharging head and sends the head driving data to the head driver, and a storage section for storing information about a defective liquid discharging portion having discharging failure (**Referring to claim 11**) and being provided inside the liquid discharging head, inside the image processing unit, or inside an external control unit (**Referring to claim 12**)

Murcia et al. discloses a printing apparatus that is capable of detecting a defective liquid discharging portion (failed nozzle) and assigning its functions to a near/adjacent liquid discharging portion to print instead of the failed discharging portion. This means that print data to the defective nozzle is transferred to the near/adjacent nozzle and the defective nozzle is no longer used or prohibited for/from printing (*FIG. 9, box 109*), wherein the printing apparatus comprises a head driver for controlling the driving of the liquid discharging head (*FIG. 8, element 74, 78*), an image processing unit (*FIG. 8, element 73*) that converts externally input image data (*FIG. 8, element 71*) into head driving data for driving a liquid discharging head (*FIG. 8, elements 20, 20'*) and sends the head driving data to a head driver (*FIG. 8, element 74,*

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78), and a storage section (*FIG. 8, elements 72, 75*) for storing information about a defective liquid discharging portion having discharging failure and being provided inside an external control unit (*FIG. 8, element 79*).

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to modify the correction method disclosed by Silverbrook to prohibit the defective nozzle to print but assign a nearby nozzle to print instead as disclosed by Murcia et al. The motivation for doing so would have been to maintain essentially single-pass operation to avoid lengthening time printing due to multiple-pass operation as taught by Murcia et al. (*Abstract*).

Silverbrook also discloses the following claimed invention:

Referring to claims 2, 4, 13, 15: wherein the discharging failure means that no droplets are discharged from the defective liquid discharging portion or wherein the discharging failure means that the amount of liquid in the droplets discharged from the defective liquid discharging portion is outside an allowable range (*page 3, lines 26-29*).

Referring to claims 5-7/2, 5-7/4, 16-18/13, 16-18/15: wherein the discharging of the droplets from the liquid discharging portion near the defective liquid discharging portion is controlled by alternately changing the discharging amount of liquid from liquid discharging portions disposed on one/both side(s) of the defective liquid discharging portion, or the number of discharging shots therefrom (*FIG. 3, elements 24 or FIG. 5: Different size dots are alternately formed by nozzle G*).

Referring to claims 8/2, 8/4, 19/13, 19/15: wherein the discharging of the droplets from the liquid discharging portion near the defective liquid discharging portion is controlled by

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discharging the droplets according to new droplet discharging signals that are generated on the basis of original liquid discharging signals for the defective liquid discharging portion and liquid discharging portions on both sides thereof in order to reduce the influence of the discharging failure of the defective liquid discharging portion (*page 4, lines 10-15: Nozzle G and I print their own normal dots and extra dots produced before and after each row in which an original dot in row h should have printed*).

Referring to claims 9, 20: wherein the new liquid discharging signals depend on the characteristics of the droplets, the type of a recording medium, or an image formation mode (*page 4, lines 25-32: The extra dots are formed in accordance to the image formation mode that is ejection frequency*).

2. Claims 22-25, 27/22-24, 29/22-24, 30-33, 35/30-32, 36/30-32, 38/30-32, 39/30-32, 40/30-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Silverbrook (WO 02/02330 A1) in view of Murcia et al. (US 6270187) and Shinobu (JP 2002240287). (*For the rejection of claims 27/22-24, 29/22-24, 35/30-32, 36/30-32, and 38/30-32, please see the rejection referring to claims 2, 4, 12, 13, and 15, respectively*).

Silverbrook, as modified by Murcia et al., discloses the claimed invention as discussed in the first rejection and also discloses wherein the new droplet discharging signals are generated only when the diameter of the dots formed on the recording medium by the droplets discharged from the liquid discharging portion different from the defective liquid discharging portion takes the minimum value or is close to the minimum value (*FIG. 3 and 5: The dots formed by nozzles G and I having a diameter close to a minimum value corresponding to normal size dots*) (**Referring to claims 25, 33**).

However, Silverbrook, as modified, does not disclose wherein controlling discharging droplets onto the recording medium while controlling the discharging direction, wherein each of the liquid discharging portions comprises a liquid chamber containing liquid to be discharged, a plurality of heating elements arranged in a predetermined direction inside the liquid chamber to generate a bubble in the liquid in the liquid chamber by the application of energy so that the liquid is discharged from a liquid discharging outlet, wherein a difference in energy to be applied is formed between at least one of the heating elements and at least another one of the heating elements so as to control the discharging direction of the liquid discharged from the liquid discharging outlet.

Shinobu discloses an ink jet head in a printer for discharging ink droplets on a printing medium to form images, wherein the print head comprises a liquid chamber containing liquid to be discharged (*FIG. 3, element 13a*), a plurality of heating elements (*FIG. 3, element 11A-B*) arranged in a predetermined direction inside the liquid chamber to generate a bubble in the liquid in the liquid chamber by the application of energy so that the liquid is discharged from a liquid discharging outlet (*FIG. 3, element 14a*), wherein a difference in energy to be applied is formed between the heating elements so as to control the discharging direction of the liquid discharged from the liquid discharging outlet (*FIG. 3, element PA and PB*), and wherein the ink discharge and the discharging direction are controlled in order to make a deviation of a impact position unnoticeable (*Abstract, FIG. 2-3*).

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to modify the discharge process disclosed by Silverbrook, as modified, to control the discharging direction as disclosed by Shinobu. The motivation for doing so would

have been to minimize the deviation of the impact position of the ink drops in order to avoid noticeable gap between the ink dots as taught by Shinobu (*Abstract*).

3. Claims 3, 5-8/3, 14, 16-19/14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Silverbrook (WO 02/02330 A1) in view of Murcia et al. (US 6270187) as applied to claims 1 and 11, and further in view of Ikeda et al. (US 6309050). (*For the rejection of claims 5-8/3 and 16-19/14, please see the rejection referring to claims 5-8/2 and 16-19/13, respectively*).

Silverbrook, as modified, discloses the claimed invention as discussed in the first rejection except wherein the discharging failure means that the discharging direction from the defective liquid discharging portion deviates from an allowable range.

Ikeda et al. defines that when a nozzle orifice becomes clogged, the nozzle fails to emit an ink droplet of a predetermined diameter and the emission direction of ink droplets is deviated from an expected position (*column 15, lines 11-17*).

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to modify the method of obtaining information about a defective nozzle disclosed by Silverbrook, as modified, to include consideration the discharging direction of ink droplets as disclosed by Ikeda et al. since the deviation of the discharging direction produces an unintentional spacing between dots that result in occurrence of a white stripe as taught by Ikeda et al. (*column 15, lines 11-20*).

4. Claims 28/22-24 and 37/30-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Silverbrook (WO 02/02330 A1) in view of Murcia et al. (US 6270187) and Shinobu (JP 2002240287) as applied to claims 22-24 and 30-32, and further in view of Ikeda et al. (US 6309050).

Silverbrook, as modified, discloses the claimed invention as discussed in the second rejection except wherein the discharging failure means that the discharging direction from the defective liquid discharging portion deviates from an allowable range.

Ikeda et al. defines that when a nozzle orifice becomes clogged, the nozzle fails to emit an ink droplet of a predetermined diameter and the emission direction of ink droplets is deviated from an expected position (*column 15, lines 11-17*).

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to modify the method of obtaining information about a defective nozzle disclosed by Silverbrook, as modified, to include consideration the discharging direction of ink droplets as disclosed by Ikeda et al. since the deviation of the discharging direction produces an unintentional spacing between dots that result in occurrence of a white stripe as taught by Ikeda et al. (*column 15, lines 11-20*).

5. Claims 10, 21, 41, and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Silverbrook (WO 02/02330 A1) in view of Murcia et al. (US 6270187), as applied to claims 8-9, and further in view of Wen et al. (US 6046822).

Silverbrook, as modified, discloses the claimed invention as discussed in the first rejection except wherein the new liquid discharging signals are listed in a table beforehand.

Wen et al. discloses a printing apparatus having a plurality of printing elements driven by one of a plurality of liquid discharging signals to eject corresponding ink drops, wherein the plurality of liquid discharging signals are stored in a table beforehand (*FIG. 2*).

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to modify the printing apparatus disclosed by Silverbrook, as modified, to

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include a table that lists a plurality of discharging signals as disclosed by Tajika et al. The motivation of doing so would have been to accurately place the ink droplets on the printing medium irrespective of physical variabilities between nozzles as taught by Wen et al. (*Abstract*).

6. Claims 26 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Silverbrook (WO 02/02330 A1) in view of Murcia et al. (US 6270187) and Shinobu (JP 2002240287), as applied to claims 25 and 33, and further in view of Wen et al. (US 6046822).

Silverbrook, as modified, discloses the claimed invention as discussed in the first rejection except wherein the new liquid discharging signals are listed in a table beforehand.

Tajika et al. discloses a printing apparatus having a plurality of printing elements driven by one of a plurality of liquid discharging signals to eject corresponding ink drops, wherein the plurality of liquid discharging signals are stored in a table beforehand (*FIG. 2*).

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to modify the printing apparatus disclosed by Silverbrook, as modified, to include a table that lists a plurality of discharging signals as disclosed by Tajika et al. The motivation of doing so would have been to accurately place the ink droplets on the printing medium irrespective of physical variabilities between nozzles as taught by Wen et al. (*Abstract*).

CONTACT INFORMATION

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAM S. NGUYEN whose telephone number is (571)272-2151. The examiner can normally be reached on 7:00AM - 3:30PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, STEPHEN D. MEIER can be reached on (571)272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LN

August 24, 2005



HAI PHAM
PRIMARY EXAMINER